



NMR and Topological Constraints in Borophosphate and Borosilicate Glasses

Invited Talk

Youngman, Randall E.; Hermansen, Christian; Smedskjær, Morten Mattrup; Yue, Yuanzheng

Publication date:
2016

[Link to publication from Aalborg University](#)

Citation for published version (APA):

Youngman, R. E., Hermansen, C., Smedskjær, M. M., & Yue, Y. (2016). *NMR and Topological Constraints in Borophosphate and Borosilicate Glasses: Invited Talk*. Abstract from Materials Science & Technology 2016, Salt Lake City, United States.
<http://www.programmaster.org/PM/PM.nsf/ApprovedAbstracts/3807D81E5B7DDE3B85257F870053FCA7?OpenDocument>

General rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal -

Take down policy

If you believe that this document breaches copyright please contact us at vbn@aub.aau.dk providing details, and we will remove access to the work immediately and investigate your claim.

NMR and Topological Constraints in Borophosphate and Borosilicate Glasses

Randall E. Youngman*, Christian Hermansen, Morten M. Smedskjaer and Yuanzheng Yue

Recent progress in temperature-dependent constraint theory paves the way for design of new multicomponent glasses with tailored properties. Atoms in network glasses are constrained by their chemical bonds and bond angles, and the strengths of these constraints depend on the local topology and the chemical nature of the elements. NMR spectroscopic studies of the short-range network structure reveal the nature of these constraints, thus enabling development of a quantitative structural model for borophosphate and borosilicate glasses. This combination of detailed structural understanding and topological constraint theory can explain the mixed network former effect (MNFE) in these types of systems, and gives accurate predictions for the composition dependence of glass transition temperature, liquid fragility and indentation hardness.